REMARKS

Reconsideration of the application is respectfully requested.

Status of the Claims

Claims 1-8 are currently pending.

New claim 9 is added. No new matter is introduced. Support for the amendment may be found, for example, with reference to Applicants' specification at page 10, lines 5 – 16.

Declaration

Co-inventor Marcos Giovani Dropa de Bortoli has provided a Declaration under 37 C.F.R. § 1.132, enclosed herewith, supplying additional data regarding both the suction valve claimed according to the present invention and the suction valve disclosed by U.S. Patent No. 4,061,443 to Black et al. ("Black"). The Declaration is provided in support of the patentability of the present claims in view of Black, as is further discussed below.

Claim Rejections – 35 U.S.C. §102(b)

Claims 1, 2, and 5 are rejected under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent No. 4,061,443 to Black et al. ("Black"), as extrinsically evident from *Mechanical Engineering Design*, page 969, by Shigley et al. ("Shigley"). This rejection is respectfully traversed.

Independent claim 1 recites:

> **1.** A suction valve for a small hermetic compressor of the type presenting a compression cylinder, which has an end closed by a valve plate, said valve comprising:
>
> a flexible vane comprising:
>
> a fixation end portion to be affixed to the valve plate;
>
> a bending median portion provided with a median opening aligned with a discharge orifice; and
>
> a sealing end portion operatively associated with the suction orifice provided in the valve plate,

wherein ***the distance between an external edge of the flexible vane and its adjacent internal edge portion of the median opening diminishes, along a higher bending region of the flexible vane of the valve, from a maximum value, close to the end fixation portion, to a minimum value***, close to the boundary of the higher bending region of the flexible vane,

wherein ***the flexible vane is configured to distribute opening forces along the higher bending region*** allowing the flexible vane to be bent along the higher bending region in an open position, and

wherein said flexible vane, presenting in its bending median portion and in its sealing end portion, a "U" shape with the legs being symmetrical about a longitudinal axis of the flexible vane, are of equal length and are united by the fixation end portion.

(Emphasis added).

In the Office Action, the Examiner asserts that Black discloses the "higher bending region" of the presently claimed invention, in part by relying on Shigley's classical model describing a cantilever end load as providing evidence that forces generated from the ending operation of the valve would be uniformly distributed along the higher bending region. Applicants respectfully disagree.

As described in the attached Declaration, for example, a finite element analysis of the Black valve shows that this design does not exhibit a uniform distribution of forces along a higher bending region of the valve vane, but rather exhibits a concentration of high Von Mises stresses in a region of the bending region that is adjacent to a fixation end portion of the vane (see, e.g., paragraphs 6 and 7 and FIGs. 7 and 9 of the Declaration).

In sharp contrast to the Black design, the design according to the present invention does not exhibit this concentrated ("pinpoint") Von Mises stress, but rather exhibits Von Mises stresses that are effectively distributed across the higher bending region (i.e., do not include high Von Mises stresses that are concentrated in a "pinpoint" region. Moreover, and as further detailed in the Declaration, the design according to the present invention: (1) generates much lower Von Mises stresses than the design described by Black; and (2) thereby permits a greater displacement valve displacement without failure than the design described by Black. Thus, for at least these reasons, Applicants submit that the Black design fails to teach "higher bending region" having the characteristics claimed in independent claim 1.

Applicants further note that, while the present rejection relies on Shigley's classical model of a cantilever end load to assert the Black design inherently provides a uniform distribution of force along a higher bending region, the Declaration clearly demonstrates the inadequacy of this model as applied to these valve designs. Shigley's model is a linear model that does not compensate for large-deflection effects experienced by these designs, or for the presence of interacting structures (for example, a gasket). With reference to paragraph 8 and FIG. 10 of the Declaration, for example, it can be seen that the results obtained by applying a linear model like that advanced by Shigley are substantially are substantially at odds with the more accurate model provided by the finite element analysis (see, e.g., FIG. 7 of the Declaration). In particular, the model of FIG. 10 fails to predict the concentration of high Von Mises stresses in the bending region that is adjacent to a fixation end portion that is revealed by the finite element analysis. Thus, the Examiner's reliance on Shigley in asserting Black as an anticipatory reference is flawed.

Accordingly, for at least the reasons described above, Applicants respectfully submit that Black fails to teach or otherwise disclose each and every element of independent claim 1, and therefore cannot anticipate independent claim 1. Accordingly, independent claim 1 is allowable. As claims 2 and 5 each depend directly from allowable independent claim 1, Applicants further submit that dependent claims 2 and 5 are also allowable for at least this reason.

Withdrawal of the rejections of independent claim 1 and dependent claims 2 and 5 under 35 U.S.C. §102(b) therefore is respectfully requested.

Claim Rejections – 35 U.S.C. §103(a)

Claims 3, 4, and 8 were rejected under 35 U.S.C. §103(a) as being obvious over Black in view of U.S. Patent No. 4,764,091 to Ikeda et al. ("Ikeda").

Claims 3, 4, and 8 depend from claim 1, and Ikeda does not cure the deficiencies of Black. Accordingly, for at least the reasons described above, it is respectfully submitted that a combination of Black and Ikeda, to the extent proper, does not render dependent claims 3, 4, and 8 obvious.

Withdrawal of the rejection of claims 3, 4, and 8 under 35 U.S.C. §103(a) based on Black and Ikeda is respectfully requested.

Claims 6 and 7 were rejected under 35 U.S.C. §103(a) as being unpatentable over Black.

For at least the reasons described above, it is respectfully submitted that claims 6 and 7 are not obvious over Black.

Withdrawal of the rejection of claims 6 and 7 under 35 U.S.C. §103(a) based on Black is respectfully requested.

Claim 2 was further rejected under 35 U.S.C. §103(a) as being obvious over Black in view of U.S. Patent No. 5,266,016 to Kandpal ("Kandpal").

Claim 2 depends from claim 1, and Kandpal does not cure the deficiencies of Black. Accordingly, for at least the reasons described above, it is respectfully submitted that a combination of Black and Kandpal, to the extent proper, does not render dependent claim 2 obvious.

Withdrawal of the further rejection of claim 2 under 35 U.S.C. §103(a) based on Black and Kandpal is respectfully requested.

New Claim

Applicants add new claim 9. As new claim 9 depends from allowable independent claim 1, Applicants submit that new claim 9 is also allowable for at least this reason.

CONCLUSION

In view of the foregoing amendments and remarks, Applicants believe the pending application is in condition for allowance and earnestly solicit same. If the Examiner believes there are any remaining issues which can be resolved by a Supplemental Amendment or an Examiner's Amendment, the Examiner is respectfully requested to telephone the undersigned at the telephone number indicated below.

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Respectfully submitted,

By _____

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